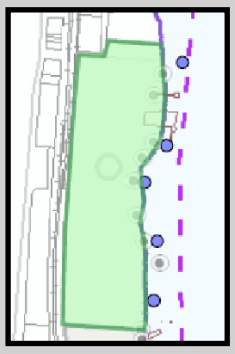
LPA Exhibit 1



Areas Posing Unacceptable Risk to Benthic Organisms

Ecological and Human Health risk assessments conducted as part of the RI identified total PCBs, and to a lesser extent dioxins/furans, PAHs, and DDx as the chemicals accounting for the most calculated human and ecological risk. Localized areas constituting approximately 5% of the study area were associated with toxicity to benthic invertebrates from total PCBs, total PAHs, and total DDTs. None of these areas were associated with LPA.

Data show the absence of contaminant concentrations at or above risk levels adjacent to or downstream of LPA.

Maximum concentrations at non-toxic stations in PBRAs

SQG	562	0.722	1.72	53,000	218	18,000	500
PBRA	Copper	Mercury	Silver	TBF	TDDx	TLPAH	TPCB
2-1E[a]							1,900
4-1E[a]							1,700
5-1W[a]						75,000	
5-9E[a]					234		
5-10W						69,000	
5-14W[a]					343		
6-2W				=SQG		650,000	
6-8E[a]		<SQG					3,250
7-1W					11,500		1,000
8-1E[a]							1,000
8-6E							2,360
8-11E							894
9-1W[a]							2,500
11-1E					320		1,300

[a]No-hit station is maximum or only sediment sample in area

Minimum concentrations at toxic stations, where all toxic stations in the PBRA exceed the SQG

SQG	562	0.249	1.72	53,000	218	18,000	500
PBRA	Copper	Mercury	Silver	TBF	TDDx	TLPAH	TPCB
3-2E							1,600
5-2W						41,000	
5-7W						86,000	
6-2W						23,000	
6-10W						31,000	
7-1W					222		
7-3W					261		
8-4E	1,080						1,600
8-14W			<SQG				930

Level 0 or 1: Chemical concentrations would be unlikely to cause adverse effects to benthic invertebrates
Level 2: Concentrations uncertain to cause adverse effects to benthic invertebrates
Level 3: Concentrations likely to cause adverse effects on benthic invertebrates

Pooled Bioassay Reference Threshold
- Level 1
- Level 2
- Level 3

Bioaccumulative Risk Area
- Total DDx
- Total PCB Aroclors

Potential Risk from Sediment Toxicity
- Exceedance of Combined Chemistry SQGs
- Area of Benthic Risk with No Toxicity Test

Copper
- Area of Benthic Risk
- Unlikely to Represent Benthic Risk

Silver
- Area of Benthic Risk

Mercury
- Unlikely to Represent Benthic Risk

Total DDx
- Area of Benthic Risk
- Benthic Risk Uncertain
- Unlikely to Represent Benthic Risk

Total PCB Aroclors
- Area of Benthic Risk
- Benthic Risk Uncertain
- Unlikely to Represent Benthic Risk

Total Low PAHs
- Area of Benthic Risk
- Benthic Risk Uncertain
- Unlikely to Represent Benthic Risk

Outfalls
- Outfall
- Dock Drain
- Roof Drain

Freeway
Arterial
Railroad
Bridge
Dock or Structure
Background Taxlot (7/08)
Upland ECSI Site (2008)
River Mile
Navigation Channel
Study Area (13-foot NAVD88)
River or Slough

0 1,000 2,000 3,000 Feet

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS.
Channel & River miles: US Army Corps of Engineers.

Wind Ward environmental LLC

LWG Lower Willamette Group

Map 6-35
Spatial Analysis of Potential Benthic Risk Areas Based on Sediment Toxicity

Portland Harbor RI/FS
Baseline Ecological Risk Assessment

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619996

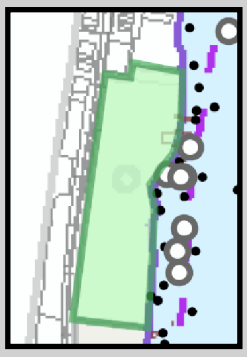
Prepared by LSM 07242009 Map 3901: W:\Projects\01-25-01 Portland Harbor ERA\Data\GIS\Events\BERA\Section6to10_HQs

LPA Exhibit 2

Total PCB Exceedances

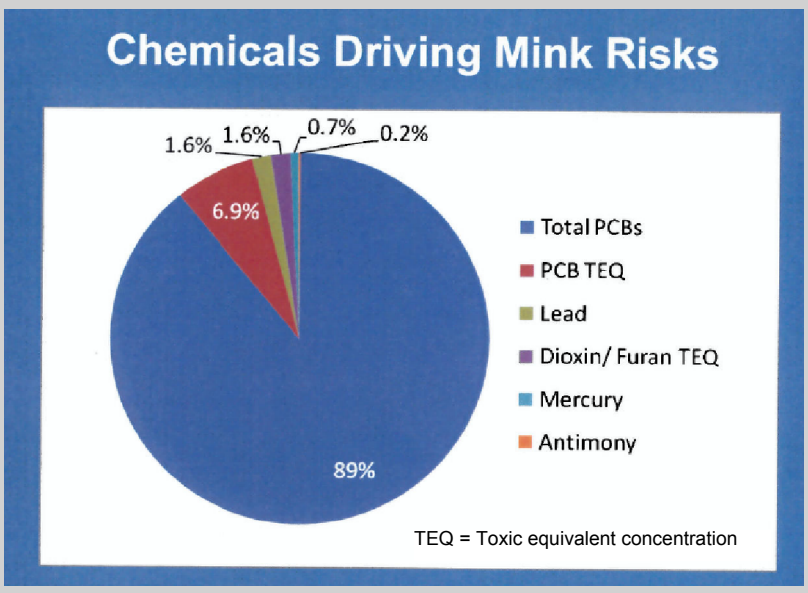
Sediment Quality Guidelines (SQGs) (both calculated site-specific values and national and generic/national values) were used to determine toxicity of sediment and potential exposure of benthic organisms. These results were combined with an effects assessment and risk characterization and uncertainty analysis.

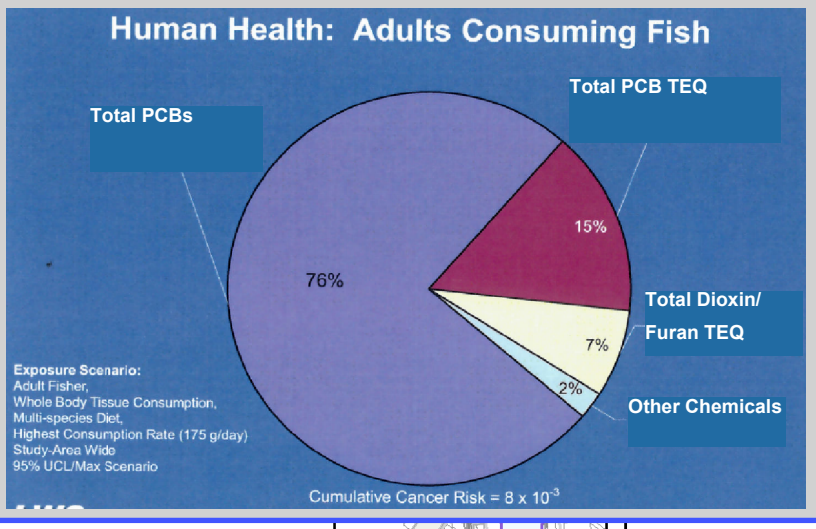
Data show the absence of detectable PCBs at or above SQGs adjacent or downstream of LPA.



Risk Drivers:

PCBs are the most significant contributor to both human and ecological risks. Bioaccumulation of PCBs and DDTs put organisms higher on the food chain at more risk, with mink and otter as the ecological receptors at the greatest risk.





Prepared by LSM 6/4/09, map 3822, W:\Projects\01-25-01 Portland Harbor ERA\Data\GIS\Events\BERA\Section6to10_HQs

Map 6-15
Exceedances of Carbazole SQGs

Map 6-16
Exceedances of Benzyl Alcohol and Phenol SQGs

Map 6-17
SQG Exceedances Plotted on NN Interpolation of Sediment Total PCB Aroclors Concentrations

Wind Ward LLC environmental
LWG Lower Willamette Group

0 1,000 2,000 3,000 4,000 Feet

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS.
Channel & River miles: US Army Corps of Engineers.

- Freeway
- Arterial
- Railroad
- Bridge
- Upland ECSI Site (2008)
- Background Taxlot (7/08)
- Dock or Structure
- River Mile
- Navigation Channel
- Study Area 13-foot NAVD88
- River or slough

Sampling Location
- Exceeds Level 3
- Exceeds Level 2
- Level 1
- Non-Detected

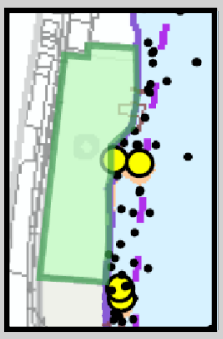
Level 1 Area
Level 2 Exceedance Area
Level 3 Exceedance Area

Portland Harbor RI/FS
Baseline Ecological Risk Assessment

LPA Exhibit 3

PAH Exceedances of SQGs

Although at some discrete points, LPAHs were detected above the low (Level 1) toxicity threshold, these detections did not result in an area potentially posing risk to benthic organisms.



The samples showing exceedances of the SQGs are located in a depositional area adjacent to LPA and are immediately downstream of areas significantly affected by PAHs.

RM-2
RM-3
RM-4
RM-5
RM-6
RM-7
RM-8
RM-9
RM-10
RM-11
RM-12
Terminal 5
Rivergate Indus
International Terminals Slip
Slip 1
Terminal 4
Slip 3
Willamette Cove
Willbridge Terminal
Swan Island Lagoon
Mock's
Balch Creek Cove
Terminal 2
Cargill Pacific
Former Gas Manufacturing Plant

Sampling Location
- Exceeds Level 2 and Level 3
- Exceeds Level 3
- Exceeds Level 2
- Level 1
- Non-Detected

Level 1 Area
Level 2 Exceedance Area
Level 2 and Level 3 Exceedance Area
Level 3 Exceedance Area

Map 6-12
SQG Exceedances Plotted on NN Interpolation of Sediment Total Benzofluoranthene Concentrations

Map 6-13
SQG Exceedances Plotted on NN Interpolation of Sediment Total HPAH Concentrations

Map 6-14
SQG Exceedances Plotted on NN Interpolation of Sediment Total LPAH Concentrations

Wind Ward LLC environmental
LWG Lower Willamette Group

0 1,000 2,000 3,000 4,000 Feet

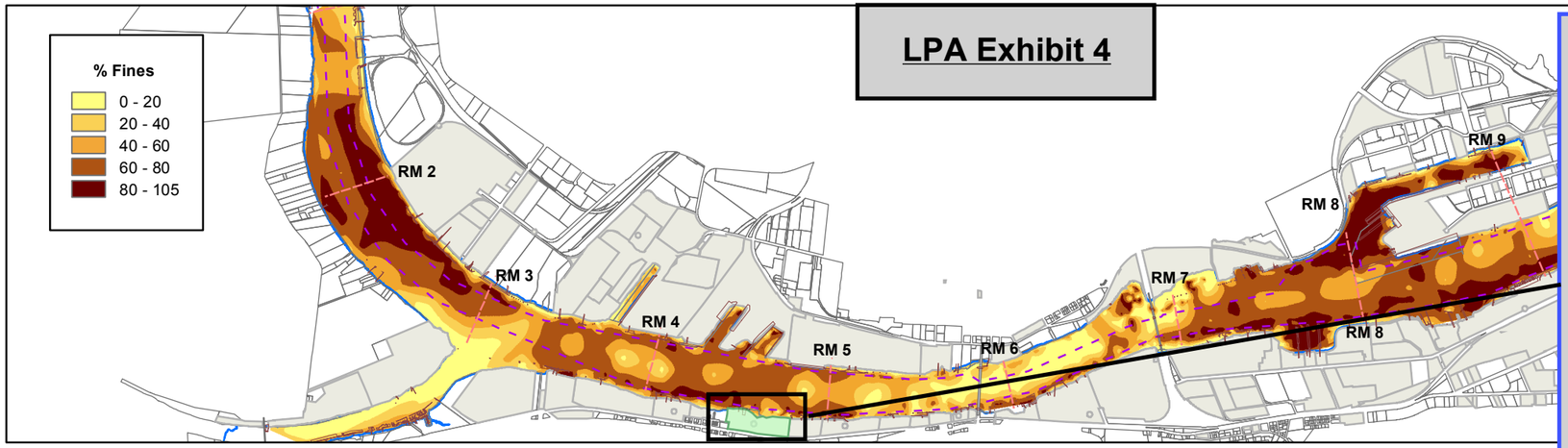
FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS.
Channel & River miles: US Army Corps of Engineers.

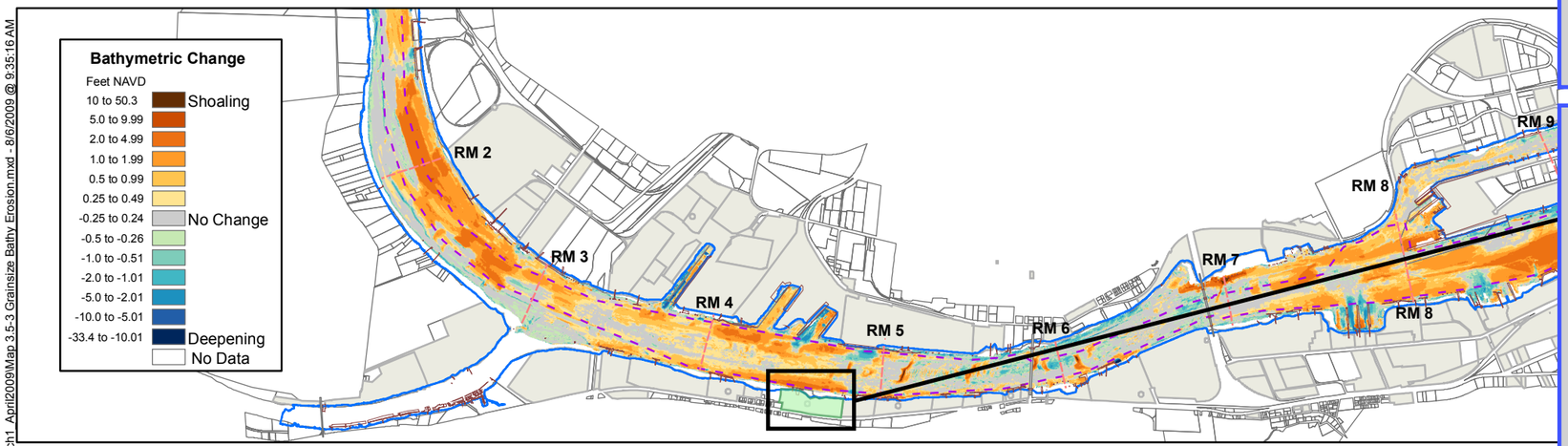
- Freeway
- Arterial
- Railroad
- Bridge
- Background Taxlot (7/08)
- Upland ECSI Site (2008)
- Dock or Structure
- River Mile
- Navigation Channel
- Study Area 13-foot NAVD88
- River or slough

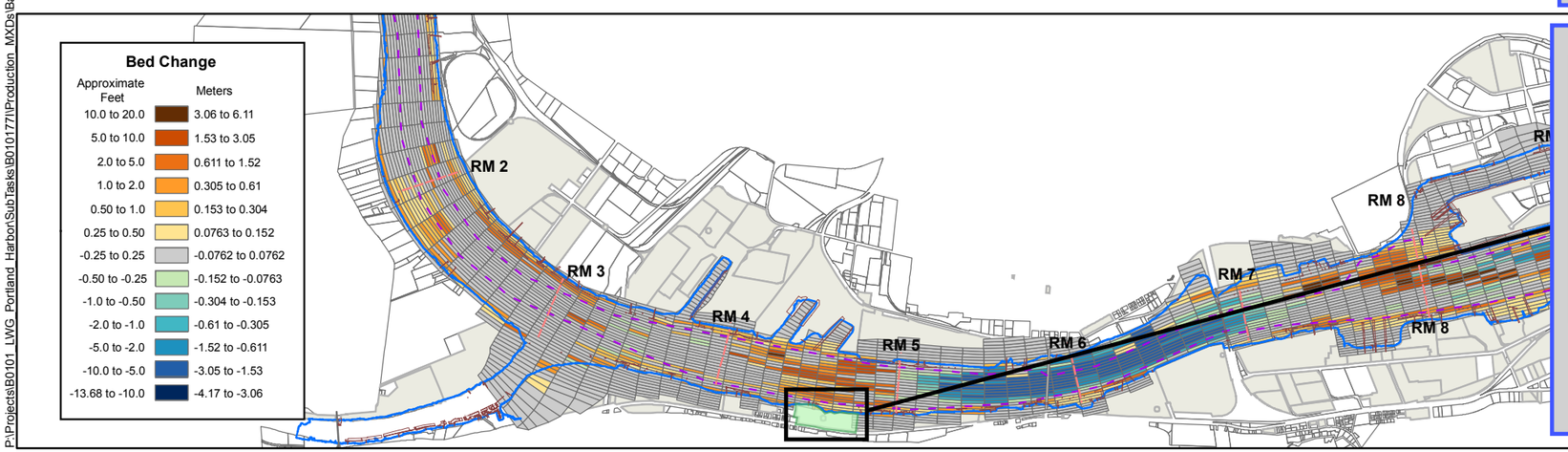
Portland Harbor RI/FS
Baseline Ecological Risk Assessment

Prepared by LSM 6/4/09, map 3821, W:\Projects\01-25-01 Portland Harbor ERA\Data\GIS\Events\BERA\Section6to10_HQs

LPA Exhibit 4







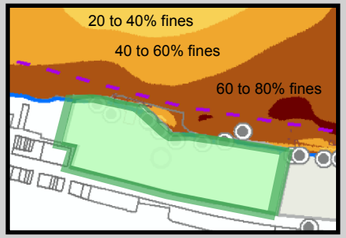
Sediment Transport

LPA is in a depositional reach of Portland Harbor, as shown by the higher percentage of fine-grained sediment, bathymetric changes from 2002 to 2009, and sediment transport modeling.

Characteristic grain sizes adjacent to LPA

Finer-grained sediments indicate depositional environments. Sediment particle sizes adjacent to LPA are dominated by silts, particularly subsurface sediment which consistently ranges between 60-80% fines. Coarser fractions indicate a higher energy scour zone upstream of LPA from river mile (RM) 5 to 7, from which sediments are likely to be eroded.

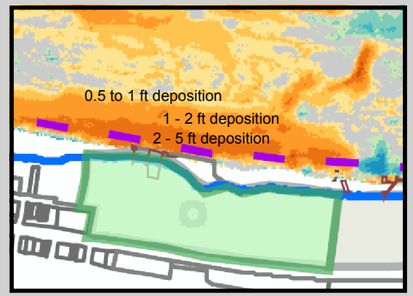
Surface sediment composition



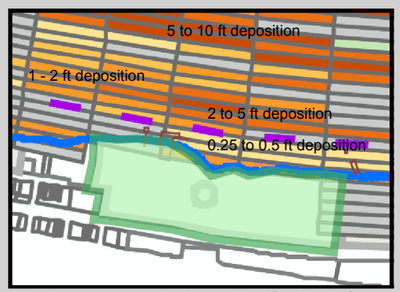
Shallow (30 cm) subsurface sediment composition (Map 3.4-3)

Measured Bathymetric Changes

River bottom elevation changes were compared over a 7 year period to determine where erosion and deposition have occurred. Net deposition of sediment was documented offshore of LPA, amounting to 2 to 5 feet in many areas indicating contaminated sediment transported from upstream sources may have been deposited adjacent to LPA.



Bathymetric change from July 2002 to January 2009



Maximum modeled erosion for high flow scenario

Sediment Transport Modeling

A hydrodynamic and sediment transport model was used in the RI to predict maximum erosion and deposition under different flow conditions. For a major flood event of 160,000 cfs[1], deposition of up to 0.5 to 2.0 feet off the shoreline of LPA was predicted, supporting the bathymetric changes measured during the RI. Significant erosion (of 10 feet or more) was predicted for the high energy zone upstream from LPA, where significant contamination is present.

1 Mean daily flows of approximately 160,000 cfs or more were recorded on 119 days (0.9 percent) over the 30-year period of record and on 14 days (0.5 percent) over the RI water years 2001 through March 31, 2008.

P:\Projects\B0101_LWG_Portland_Harbor\SubTasks\B010177\Production_MXDs\Batch1_April2009\Map 3.5-3 Grainsize Bathy Erosion.mxd - 8/6/2009 @ 9:35:16 AM

integral consulting inc.

LWG Lower Willamette Group

N

0 0.25 0.5 1 Mile

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS.
Channel & River Miles: US Army Corps of Engineers.
Bathymetric Information: David Evans and Associates, Inc.

Map Features

- River Miles
- Navigation Channel
- River Edge +13 ft NAVD
- Bridges
- Docks and Structures
- Upland ECSI Sites (2008)
- Waterfront Taxlots

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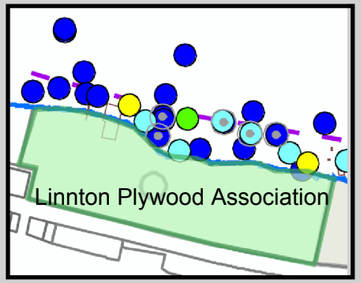
Map 3.5-3
Portland Harbor RI/FS
Draft Remedial Investigation Report
Study Area Grain Size, Bathymetric Change, and Modeled Maximum Erosion

LPA Exhibit 5

RM 1
RM 2
RM 3
RM 4
RM 5
RM 6
RM 7
RM 8
RM 8
RM 9
RM 10
RM 11
RM 12

Distribution of Total PCBs in Surface Sediment

PCB detections were randomly distributed adjacent to LPA consistent with the depositional zone for fine grained sediments. The detections of PCBs on the upstream property boundary are not consistent with an onsite release from LPA.



Total PCBs (µg/kg)

- 0-34
- 34-75
- 75-150
- 150-300
- 300-1000
- >1000
- Detected
- Not Detected

integral consulting inc.

LWG Lower Willamette Group

N

0 1,000 2,000 3,000 4,000 5,000 Feet

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS .
Channel & River miles: US Army Corps of Engineers.
Bathymetric Information: David Evans and Associates, Inc.

Map Features

- River Miles
- Navigation Channel
- River Edge +13 ft NAVD
- Bridges
- Docks and Structures
- Surface Dredge/Cap Locations
- Upland ECSI Sites (2008)
- Waterfront Taxlots

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Map 5.1-1
Portland Harbor RI/FS
Draft Remedial Investigation Report
Surface Sediment Chemistry
Total PCBs (µg/kg)

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LPA Exhibit 6

Distribution of Total PCBs Through the Sediment Column

PCB data from sediment cores indicate relatively low PCB concentrations in surface sediments with higher concentrations present at considerable depth. This pattern is evident in upstream cores indicting transport and deposition of sediment containing of PCBs to areas adjacent to LPA.

Total PCBs (µg/kg)
- 0-34
- 34-75
- 75-150
- 150-300
- 300-1,000
- > 1,000
- Not Analyzed

RM 4

RM 5

Inset 1

Inset 2

Linnton Plywood Association

Grab (surface) Sample ID

Core (subsurface) Sample ID

Map Document: (O:\SubTasks\B0101_77K_RI_Sect5\Production_MXDs\CoreRevisions2009_03_03\2009-03-10_Sec5.1_Map 5.1-2_Cores_PCBs_Main.mxd) - 3/24/2009 -- 11:24:56 AM

integral consulting inc.

LWG Lower Willamette Group

N

0 150 300 450 600 750 Feet

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS .
Channel & River miles: US Army Corps of Engineers.
Bathymetric Information: David Evans and Associates, Inc.
NOTE: Bottom of cores are generally placed at core sample station, if not possible a tag line indicates the sample location.

Map Features
- River Miles
- Bridges
- Docks and Structures
- Navigation Channel
- River Edge +13 ft NAVD

Outfalls
- Outfall
- Dock Drain
- Roof Drain

- Surface Chemistry
- Core Locations
- Capping Areas
- Dredging Areas
- Surface Dredge/Cap Locations

- Upland ECSI Sites (2008)
- Waterfront Taxlots

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Map 5.1-2e
Portland Harbor RI/FS
Draft Remedial Investigation Report
Subsurface Sediment Chemistry
Total PCBs (µg/kg)

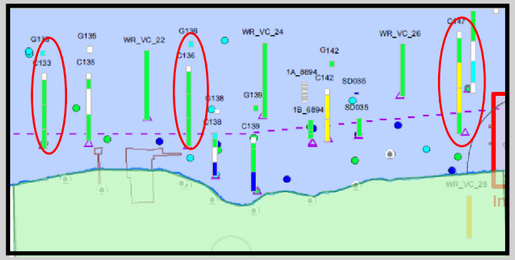
River Mile 04 to 05 - Slips

LPA Exhibit 7

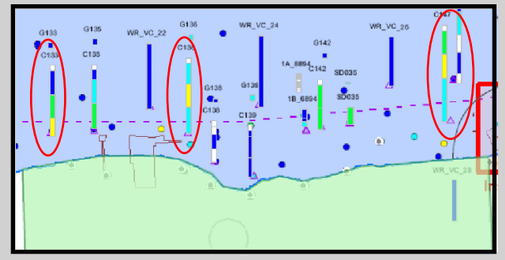
RM 1
RM 2
RM 3
RM 4
RM 5
RM 6
RM 8
RM 8
RM 9
RM 10
RM 11
RM 12
RM 8

Colocation of Multiple Contaminants

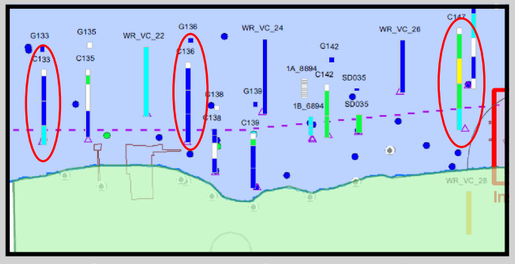
The pattern of contamination in sediment cores indicates elevated levels of multiple contaminants at the same depth intervals and at the same locations, indicating historical and episodic deposition of contaminated sediment adjacent to LPA.



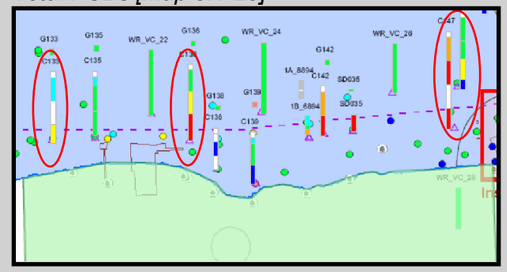
Total DDx [Map 5.1-8e]



Total PCBs [Map 5.1-2e]



Total PCDD/Fs (dioxins/furans) [Map 5.1-4e]



Total PAHs [Map 5.1-10e]

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LWG LOWER WILLAMETTE GROUP

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS .
Channel & River miles: US Army Corps of Engineers.
Bathymetric Information: David Evans and Associates, Inc.

0 1,000 2,000 3,000 4,000 5,000 Feet

Map Features

- River Miles
- Navigation Channel
- River Edge +13 ft NAVD
- Bridges
- Docks and Structures
- Surface Dredge/Cap Locations
- Upland ECSI Sites (2008)
- Waterfront Taxlots

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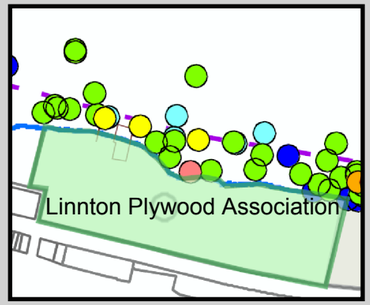
Map 5.1-7
Portland Harbor RI/FS
Draft Remedial Investigation Report
Surface Sediment Chemistry
Total DDx (µg/kg)

LPA Exhibit 8

RM 1
RM 2
RM 3
RM 4
RM 5
RM 6
RM 7
RM 8
RM 8
RM 9
RM 10
RM 11
RM 12



Distribution of Total PAHs in Surface Sediments

Very high concentrations of PAHs are present upstream of LPA in areas of significant sediment erosion. The pattern of PAH concentrations adjacent to LPA is consistent with deposition from upstream sources.

Total PAHs (µg/kg)

- 0-500
- 500-1,000
- 1,000-5,000
- 5,000-10,000
- 10,000-20,000
- 20,000-30,000
- >30,000
- Detected
- Not Detected

integral consulting inc.

LWG Lower Willamette Group

N

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS .
Channel & River miles: US Army Corps of Engineers.
Bathymetric Information: David Evans and Associates, Inc.

0 1,000 2,000 3,000 4,000 5,000 Feet

Map Features

- River Miles
- Navigation Channel
- River Edge +13 ft NAVD
- Bridges
- Docks and Structures
- Surface Dredge/Cap Locations
- Upland ECSI Sites (2008)
- Waterfront Taxlots

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Map 5.1-9
Portland Harbor RI/FS
Draft Remedial Investigation Report
Surface Sediment Chemistry
Total PAHs (µg/kg)

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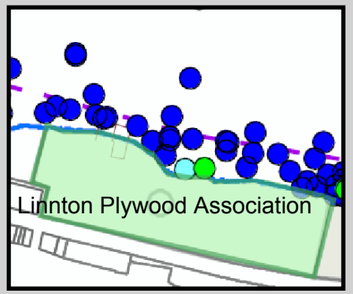
LPA Exhibit 9

RM 1
RM 2
RM 3
RM 4
RM 5
RM 6
RM 7
RM 8
RM 8
RM 9
RM 10
RM 11
RM 12



Distribution of Lead in Surface Sediments

Lead is present at background concentrations in most locations adjacent to LPA. Somewhat higher concentrations are confined to an embayment area most prone to sediment deposition. Higher concentrations are present upstream.

Lead (mg/kg)

- 0-30
- 30-60
- 60-90
- 90-120
- 120-150
- >150
- Detected
- Not Detected

integral consulting inc.

LWG Lower Willamette Group

N

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS .
Channel & River miles: US Army Corps of Engineers.
Bathymetric Information: David Evans and Associates, Inc.

0 1,000 2,000 3,000 4,000 5,000 Feet

Map Features

- River Miles
- Navigation Channel
- River Edge +13 ft NAVD
- Bridges
- Docks and Structures
- Surface Dredge/Cap Locations
- Upland ECSI Sites (2008)
- Waterfront Taxlots

DRAFT

DO NOT QUOTE OR CITE
This document is currently under review by US EPA and its federal, state, and tribal partners, and is subject to change in whole or in part.

Map D1.1-47
Portland Harbor RI/FS
Draft Remedial Investigation Report
Surface Sediment Chemistry
Lead (mg/kg)

P:\Projects\B0101_LWG_Portland_Harbor\SubTasks\B0101_77K_RI_Sect5\Production_MXDs\DetMaps_Final_Submittal\Sec5_1_Map_D_1-47_Surface_Sed_Lead.mxd - 9/8/2009 @ 10:46:53 AM